

ABSTRACT OF THE DISCLOSURE

A nanomachining method for producing high-aspect ratio precise nanostructures.

The method begins by irradiating a wafer with an energetic charged-particle beam.

Next, a layer of patterning material is deposited on one side of the wafer and a layer of

5 etch stop or metal plating base is coated on the other side of the wafer. A desired
pattern is generated in the patterning material on the top surface of the irradiated wafer
using conventional electron-beam lithography techniques. Lastly, the wafer is placed in
an appropriate chemical solution that produces a directional etch of the wafer only in the
area from which the resist has been removed by the patterning process. The high
mechanical strength of the wafer materials compared to the organic resists used in
conventional lithography techniques allows the transfer of the precise patterns into
structures with aspect ratios much larger than those previously achievable.